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How to Cultivate a Talent for Drawing.

The ability to delineate objects of nature and art is not only one of the most graceful, but most useful accomplishments, and should be cultivated by every person who has a taste for it, and especially should it be fostered in childhood. On this subject, Ruskin, the eloquent writer on architecture, painting and the ornamental arts, says :—

"If a child has talent for drawing, it will be continually scrawling on what paper it can get; and should be allowed to scrawl at its own free will, due praise being given for every appearance of care or truth in its efforts. It should be allowed to amuse itself with cheap colors almost as soon as it has sense enough to wish for them. If it merely daubs the paper with shapeless stains, the color box may be taken away till it knows better; but, as soon as it begins painting red coats on soldiers, striped flags to ships, &c., it should have colors at command; and, without restraining its choice of subject in that imaginative and historical art, of a military tendency, which children delight in (generally quite as valuable, by the way, as any historical art delighted in by their elders), it should be gently led by its parents to try to draw, in such childish fashion as may be, the things it can see and likes—birds, or butterflies, or flowers, or fruit. In later years the indulgence of using the color should only be granted as a reward, after it has shown care and progress in its drawings with pencil."

Improvement in Tenon Saws.

This improvement consists in the use of two saws, obliquely set on the axle at any angle that may be required. The saws cut the tenon of any thickness, and in any position that is wanted. Fig. 1 is an elevation of the saws, washers and axle set for cutting a tongue in the center of the stuff. Fig. 2 is a view showing the section of the beveled and concave washers, and the saws set for cutting a tongue more at the side of the stuff. A is the spindle, B the pulley which receives the driving power, and *b b* are the journals. Beyond the collar, *c*, which is forged and turned on the spindle, extends the plain part, *d*, Fig. 2, on the outer end of which a screw is cut for receiving the tightening nut, *e*. *f f* are the saws, and *g g* the beveled washers between them. Outside of the saws are the washers, *h h*, which bear flat against the saws, and have concave recesses turned in them for receiving the convex rings, *i i*. J is the piece of stuff which is being cut.

As the bevel washers, *g g*, are greater or less in thickness, the width of the tongue will be greater or less, the narrowest space between the saws being the thickness of the tenon.

HARRISON'S IMPROVEMENT IN TENON SAWS.

Fig. 1

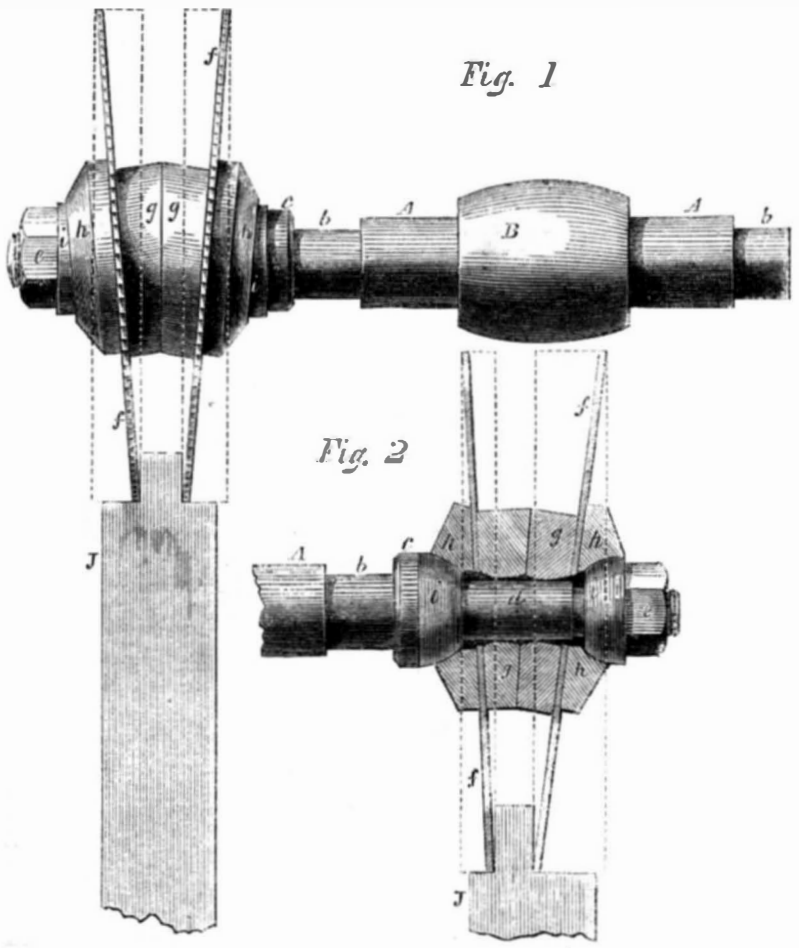
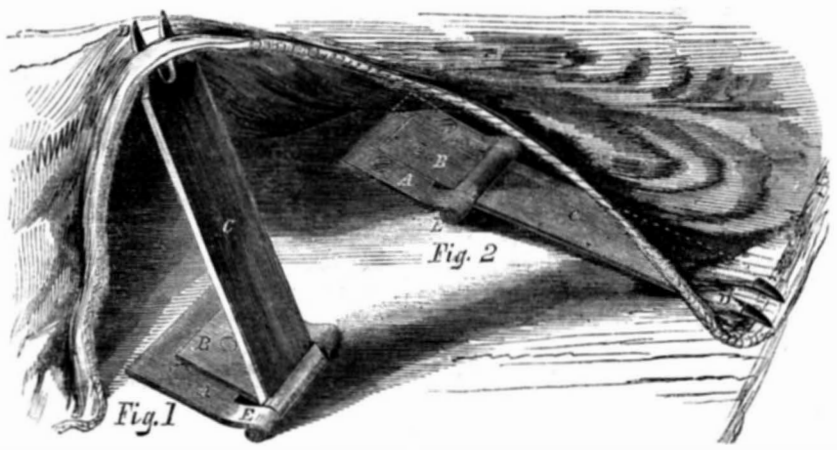


Fig. 2

This space can be varied by changing the position of the two interior washers, and will be least when the thinnest parts of the washers are brought into coincidence. In addition to the thickness of the tongue, the relative obliquity of the saws to the axis of the spindle can, by means of the washers, *h h*, and rings, *i i*, be made such that one saw will stand more oblique than the other, thus admitting of the cutting away of more wood on one side than the other, and so changing the position of the tongue as regards the end of the stuff, as seen in Fig. 2. This is a very useful invention, and wood-workers will appreciate its merits at a glance. It can be seen at the Crystal Palace, where there is one on exhibition.

For further information address the inventor, W. H. Harrison, No. 705 Lodge alley, Philadelphia, Pa. Patented July 14, 1857.

SCHROEDER'S IMPROVED CARPET FASTENER.



The usual method of securing carpets, druggets and covers in general to a floor is, (as all our lady readers know) after having made it a trifle smaller than the space it has to cover, by stretching it with a stick and then nailing it down; and every time that the carpet is taken up, this process has to be gone through, much to the damage of both the floor and fabric, and often do the carpets tear from the tacks by the contraction which they experience in certain stages of the atmosphere, and, as the help says "They come undone of themselves." This is all prevented by the invention of R. E. Schroeder, patented April 21, 1857, and here illustrated.

Fig. 1 shows the fastener standing up, and the carpet loosely fastened to it, and Fig. 2 the same, showing the manner it holds the carpet down.

A is a metal frame fastened to the floor. B is a spring, which, when the fastener, *c*, gets downward in the direction of the floor, at an angle of 45°, it forces it to rest on the floor, and holds it there until pulled vertically up again by hand or other means. C is the fastener, revolving through half a circle on a hinge, E, under which is the spring. The fastener has also on the end two prongs, D, which are inserted in the carpet.

This invention is likely to answer well, as it does not tear the carpet or injure the floor. When once they are put down, they may be regarded as fixtures, there being no occasion to take them up until worn out; and instead of it taking two men to lay or remove a carpet, one female may do it with ease in a very brief space of time.

Those of our readers who wish for further information may obtain it of the agent, Augustus Fuller, 83 State street, Rochester, N. Y.

Niello.

Niello is a peculiar style of enameling, which consists in engraving or stamping figures on a plate of silver or gold, and then filling the incised lines, or impressed pattern, with a sort of enamel, differing, however, from true enamel, which is a kind of glass, by being formed of a mixture of the sulphates of lead, silver and copper. This mixture is a black color—hence the name niello, from nigellum, derived from niger, black—and when melted into the intaglio parts of a plate gives it somewhat the appearance of an inked engraved copper plate. A new kind of niello work was some time since introduced in Europe, in which, however, the figures are not produced by an enamel of sulphuret of silver, as in the true niello, but by a different colored metal; thus on a plate of gold may be produced fine engravings, the lines of which are in silver.

And this kind of work is at the present time very much in vogue among the great and rich who can afford the uncomfortableness (for luxury it is not) of eating off silver and drinking out of gold.

Myrrh.

This substance is an agreeable perfume and is much valued by eastern nations for its antiseptic qualities as well as for its delightful odor. It was and is largely used as a component part of incense, and also in the embalming of the dead. In the tombs of Egypt, where the mummies of the great have lain in preservation for ages past, the odor of myrrh is very strong, and we have every reason to believe that it was one of the chief ingredients in the preparation of mummies. It is a gum resin, and occurs in tears of various sizes. They are reddish-brown, semi-transparent, brittle, of a shining fracture, appear as if greasy under the pestle, have a very acrid and bitter taste, and a strong smell. Myrrh flows from the incisions of a tree not well known, which grows in Arabia and Abyssinia, supposed to be a kind of *amyris* or *mimosa*. It consists of resin and gum in the proportions of 36 of the former to 66 of the latter. We use it only as a medicine.

Labor.

The value of an industrial population cannot be too highly estimated, as however much capital may be at command, it is of no use until the true material, the hard working laborer or skillful mechanic are at hand to expend it and produce in its stead a road, a canal, a steam engine or a ship. Money is really worthless except in the relation it bears to the laborer; and the two are each dependent on the other, so the capitalist is entitled to the respect of the laborer, who in his turn has a right to the same from the moneyed man.

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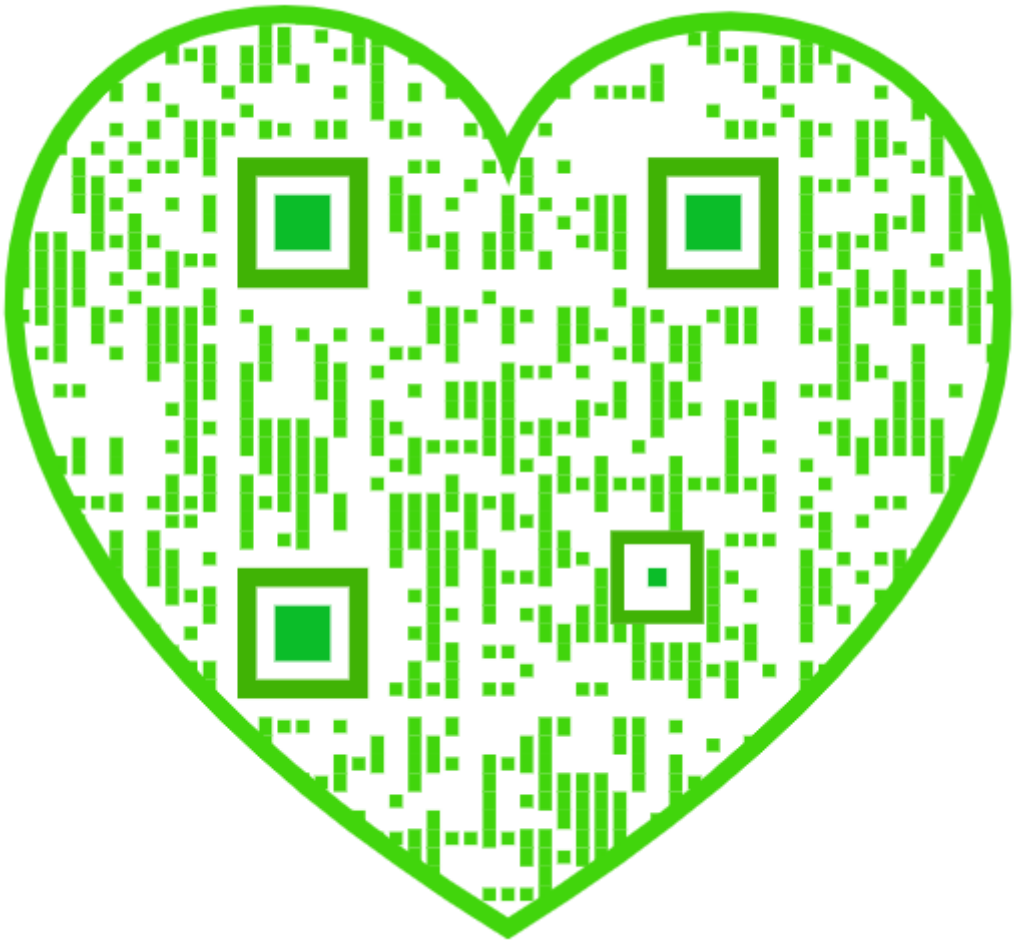

Issued from the United States Patent Office

FOR THE WEEK ENDING SEPTEMBER 29, 1857.

[Reported officially for the Scientific American.]

HOLDING AND SETTING LOGS IN CIRCULAR SAWING MACHINES—James H. Bachelder, of Rome, Mich.: I am aware that machines have been previously devised for accomplishing the same object as the one herein described. The arrangement of the two circular saws is not new—they have been previously used as shown, and for the same purpose. In view of these facts, therefore, I confine myself to the particular means employed for effecting the purpose set forth.

First, I claim setting the log, D, to the saws, or giving it its lateral movement at the termination of each stroke or movement of the carriage, B, by means of the screws C C, on which the nuts, g, on the uprights, i, work, the screw, C, being turned at the proper time by means of the belt, o, which is made to act upon the wheel, t′, by means of the loop, y′, attached to lever, a″, the lever being actuated by the forked lever, d″, coming in contact with the projections, f, on the plates, Q R, attached to beam A′ the length of movement of the log being determined or regulated by the rack rod, P, pawl, e″, arranged as shown, or any equivalent device.

Second, I claim securing the log, D, in the carriage, B, or to the cross-piece, l, supported therein by the uprights, i, by means of the rods, n n o, attached to the cross-piece, l, by means of the plates, m, and rods, p, having eccentrics, q, on them—the eccentrics being in one end of the plates, and the rods, n n o, passing through the opposite ends as shown and described.

COMPOSITION FOR COVERING MEATS—John J. Bate, of Brooklyn, N. Y., and Frances S. Low, of Jersey City, N. J.: We do not claim, broadly, as our invention, the covering of meats and other articles with paper, cloth, or other flexible material.

Nor do we claim protecting such articles after being covered by coating their covering with a composition to protect and preserve them from injury by water, dampness or vapor.

But we claim the use of shellac, vernish, and beeswax, in combination with the materials described, and in about the proportions named, for the purpose of forming the composition set forth.

LARD-RENDERING KETTLES—John J. Bate, of Brooklyn, N. Y.: I do not claim the construction and combination of the kettle and the shell, as described, nor the application or use of steam to heat the kettle, nor the use of a shifting valve to permit the air confined in the space around the kettle to be discharged, nor the use of a vacuum valve to permit the air to fill the space around the kettle, when a vacuum shall be formed there by the condensation of the steam contained therein.

But I claim the combination of the valve, G, acting both as a snifting and a vacuum valve, with the shell, A, and kettle, B, as and for the purposes set forth.

STEAM PRESSURE GAGES—Henry Bates, of New London, Conn.: I do not claim an elastic disk for actuating the gearing which gives motion to the pointer.

Neither do I claim a sector for actuating the pointer except it be arranged to return to its original position by its own gravity without the aid of a spring.

But I claim the arrangement of the sector with teeth on its side face, and radial bearing projection near its axis on an axis which is at right angles to the shaft of the pointer pinion and in proper relation for united action to said pinion, and to a controlling stud, which terminates in an eccentric curve, substantially as and for the purposes specified.

APPARATUS FOR OPENING OYSTERS—Waldren Beach, of Baltimore, Md.: I claim the combination of lipped bar, C, treddle, K, and spring, h, with the cutting head piece, B, constructed, arranged, and operating substantially as and for the purpose set forth.

LIFE-PRESERVERS—Charles J. Bunker, of New York City: I claim a life-preserver constructed of two or more sheets of water-proof fabric with the series of air cells arranged substantially as set forth, and so as to cover the upper and vital parts of the body, for the uses and purposes set forth and described.

CRIBS OF HORSES' STABLES—William Croasdale, of Hartsville, Pa.: I claim the revolving roller, A, in connection with the striker, B, as described.

STEAM BOILERS—William M. & Jonas B. Ellis, of Washington, D. C.: We claim connecting the upper and lower parts of the shell of the body of the boiler by means of a strong perforated plate, N, which performs the double office of staying the boiler, and forming a passage for the circulation of the water and steam through the legs and body of the boiler.

FASTENINGS FOR JEWELRY—John T. Folwell, of Philadelphia, Pa.: I claim the round post with a notch filed in it to receive the pin or tongue in, and a sheath fitting tight round the post, and shifted by a lever, so that when in one position the tongue can be put into the notch, and when put into the opposite position it secures the tongue in its place, so that it cannot come out without shifting the lever, as described.

PREPARING ROOFING CEMENTS—Robert T. Havens, of Casstown, Ohio: I do not claim that the ingredients specified have not been used before in compositions, but do claim that they have not been so combined as to produce any article identical with, or equivalent, or similar to the above.

I claim the process of combinin and pressing coal tar and sand with paper or wood, in the manner described and represented, for the production of an artificial slate.

FACTITIOUS OILS—Joseph W. Harmon, of Elizabethtown, N. J.: I do not wish to be understood as confining myself to the exact proportions described, as the quantity of the materials will require judgment in the compounding, but those named I have used with the most perfect success.

I claim the employment of the residuum of candle manufactories as named, compounded with the ingredients set forth, in a manufacture of a compound oil, as specified.

HYDRAULIC ENGINE—John D. Heaton, of Dixon, Ill.: I claim the peculiarly constructed form and application, and the arrangement of the stationary valves, k k n n o, as operated.

I also claim the construction and arrangement of the water chambers, e e e, pressure compartments, g g, and cylinder, f f, combined in one single piece, substantially as shown and described.

SEWING MACHINES—Edward A. Jenks and John Underwood, of Lowell, Mass.: We are aware that a looper has been moved by the action of the needle, but in a way entirely different from our invention.

We disclaim the rigid guide and feed piece, as employed in the patent of J. B. Woodruff, dated December 23, 1856; also the use of a spring presser for holding the cloth, as this device has been long in use in sewing machines.

We claim the arrangement of the spring feed piece, S, with its pressure guide or sheath, R, substantially as described, for the purpose set forth.

Second, We also claim the rollers, D D′, and looper, H, as arranged and operating in combination with the needle, for the purpose specified.

COATING HOSE PIPE—Charles H. Hinckley, of Stonington, Conn.: I claim the process of constructing pipe of textile and fibrous material, with an internal coating of vulcanized india rubber, viz.: first applying the india rubber coating on the outside, and afterwards inverting the same by drawing it over and through a metallic cylinder.

BIT HOLDER—Benjamin B. Hill, of Chicopee, Mass.: I claim the diagonal bit holder, having a projection or rest, T, which forms a guard to the bevel gears, and gives support to the bit, as described.

APPROACH OPENING GATE—Charles A. Howard, of Pontaic, Mich.: I do not claim, broadly, the operating of the latch or catch by means of the weight of the vehicle as it approaches the gate, and also after it has passed through it.

Neither do I claim, broadly, the operating of the gate by means of a weight or spring.

But I claim applying the power of a weight or spring to the gate through the medium of the crank shaft, K, connecting rods, g g and f f, in combination with the latch or catch, D, arranged with the levers, r r, and bars S S, so as to operate conjointly, as and for the purpose specified.

REED STOPS FOR MUSICAL INSTRUMENTS—Amos P. Hughes, of Philadelphia, Pa.: I claim the stopping of reeds by forming an air-tight chamber or chambers outside of the reeds with the swell, or by other means, in combination with the open communication between the inside of the chamber or chambers and the interior of the wind-chest or bellows, or any other arrangement substantially the same, and for the purpose set forth.

CORK SOLE STUFF—William Johnson, of Brooklyn, N. Y.: I claim the making of cork cloth by the aforesaid process for inside soles and lining of boots, shoes, and other articles for which solid sheet cork has hitherto been applied, using for that purpose the aforesaid materials, or others substantially the same, to produce the same results.

CUTTING BUNGS—Josiah Kirby, of Cincinnati, Ohio: I claim the oscillating bit holders, v v, when operated by means of opposite bevels on the center rod, b, acting against the adjusting rods, a a, and the tail screws Y Y, in the manner and for the purpose described.

Second, I claim the mode of grasping the block and freeing the finished bung, when arranged and operating in the manner set forth.

SETTING DIAMONDS, &C.—Isaac Lindsley, of Providence, R. I.: I do not claim generally the setting of stones in or between points.

But I claim the raising of points or studs, i i, on the veins of the blank by the same punching operation which forms the blank, thereby producing a superior setting, which gives a greater brilliancy to the stones, at a cost of labor not greater than that of the setting commonly used in cheap jewelry.

GAS BURNERS—William H. Lindsay, of Brooklyn, N. Y.: I do not confine myself to the particular or precise form or arrangement of the several parts, as described and shown, as the same may be modified in various ways, which I claim doing whilst producing results substantially the same.

I claim the application to a gas burner or burners of angular pieces or deflectors, or the equivalent thereof, substantially as described, for the purpose of increasing the light derived from one or more streams of gas issuing or escaping from a gas burner or burners of any suitable construction, by altering and directing the current or currents of gas, and the form of flame.

HAME TUG FASTENING—William J. Lockwood, of Sturgis, Mich.: I claim the stud or button holder D, and the button or lock, C, in combination with the socket b, when operating together substantially in the manner and for the purpose described.

MANUFACTURE OF THE UPPERS OF BOOTS AND SHOES WITHOUT SEAMS—Samuel Middleton, of England. Patented in England November 3, 1856: I am aware that drinking cups and blinds for horses' bridles have been stamped out of leather, therefore I limit my claim to making the uppers of boots and shoes.

I claim stretching and forming the upper leather for boots and shoes from a single piece of leather, without seams, substantially as described.

BURGLAR'S ALARMS—E. M. and J. E. Mix, of Ithaca, N. Y.: We are aware that firearms have been applied to doors, to serve as alarms, and as means of defence in cases of attempted burglary, and we do not claim broadly such application.

But we claim the construction of the device as shown and described, for the purpose specified, to wit.: the hammer or cock, D, spring, E, trigger, F, and rod, G, constructed, arranged, and applied to the barrel, B, and stock, A, substantially as set forth.

SEPARATING OILY MATTER FROM WATER—James Naughten, of Cincinnati, Ohio: I claim the arrangement of the chambers, a B and C, when the chambers, a and B, are connected with the opening, d, as represented, and all used in the manner and for the purposes specified.

SPIKES—Orrin Newton, of Pittsburgh, Pa.: I claim constructing the spike with concave sides, a, and edges, b, substantially as shown and described, for the purpose set forth.

CORN SHELLERS—J. J. Parker, of Marietta, Ohio: I am aware that a sheller consisting of a face wheel working against a vertical burr wheel, patented to Peck, has been suggested as a corn sheller, but its efficiency for shelling corn is questionable; neither is there any provision for clearing the corn by fan or otherwise.

Neither do I claim the mere combination of a sheller and fan irrespective of the arrangement I have discovered.

But I claim the necked shelling wheel, D, when arranged and operating in connection with the shelling wheel, F, and elastic side, C, of spout, H, and spring, d, in the manner and for the purposes set forth.

APPARATUS FOR ROASTING OR COOKING STOVES, RANGES, &C.—Samuel Pierce, of Troy, N. Y.: I claim the construction and arrangement of the apparatus as specified, for the purpose of combining with a range or stove for the purpose of roasting, as set forth.

MANUFACTURING POTTERY WARE—Philip Pointon, of Baraboo, Wis.: I do not wish to be understood as claiming a plunger descending into a revolving mold, nor a movable bottom, acted upon through a hollow shaft, both of which, I am aware, are in use.

But I claim operating the movable bottom, n, and plunger, L, simultaneously, by means of the sliding rods, h, and cross head, P, in combination with lever, I, and rack, K, the whole arranged substantially as set forth.

AWNING FRAMES FOR HORSES—N. Pullman, of New Oregon, Iowa: I do not confine myself to the precise arrangement of the parts forming the frame, or the manner in which they are connected with the harness, my invention being, in these particulars, susceptible of various modifications, according to the circumstances in which it is used.

I claim first, Arranging the frame for the support of an awning over draught horses with a flexible joint, so that it can be folded back from the head and neck of the horse, and removed with the harness, as described.

Second, Connecting the front bow with the bridle by means of flexible bands, for the purpose set forth.

FASTENING FOR METALLIC BANDS OF COTTON BALES, &C.—Charles J. Provost, of Sardis, Ala.: I do not claim a slide in combination with the locks on the end of the hoop.

But I claim so forming the slide as that its ends may be struck down behind the bow or bend of the locks, and thus not only prevent the lock from separating, but also holding the slide to the lock, substantially as herein set forth.

PROTECTING BUILDINGS FROM FIRE—Thomas Odion, of Portsmouth, N. H.: I claim the method herein described of protecting property against fire by means of a portable screen, in the manner substantially as set forth, or in any other equivalent manner.

ATTACHING ADJUSTABLE HANDLES TO JOINERS' PLANES—Thomas D. Worrall, of Lowell, Mass.: I claim first, The combination and arrangement of cap plate D, screw, E, nut, F and T, slot, o, in the plane, for the purpose of providing and securing a movable handle to planes.

Second, I claim the arrangement of cap plate, D, slotted strap, C, and screw, a, for the purpose of adjusting the handle vertically when desired by the operator, as set forth and described.

WIRE FENCES—J. B. Reyman, of Bloomington, Ill.: I claim bending or kinking the wires by the means in the manner and for the purpose substantially as described.

STEMMING AND POLISHING PEANUTS—Samuel Shepherd, of Nashua, N. H.: I lay no claim to any specific machine, except when used for the purpose herein described.

I claim stemming and polishing peanuts, in the manner set forth, by means of the machinery described, or the substantial equivalents thereof.

HEMP BRAKES—Conrad Simon, of Louisville, Ky.: I claim the combination of the breaking rollers, c c, with the mouth-piece, a, arranged and operating in the manner described, for the purpose specified.

I do not claim, broadly, the rollers or mouth-piece as such, for they have been in use, and are well known in other machines for other purposes.

WINDOW FOR LOCOMOTIVES, &C.—Henry Skinner, of Fulton, N. Y.: I claim the application of heat to glass to prevent vapor or frost from collecting thereon, as substantially described, and for the purpose set forth.

DRILLING AND MILLING MACHINE—Wm. D. Sloan, of New York City: I claim the mode of operation substantially as described, for securing and holding the blocks to the periphery of the wheel, by which they are shifted from place to place, which mode of operation results from the combination of the radially sliding stirrups, or their equivalents, with the wheel and the mechanism operating the said stirrups to liberate and gripe the blocks or any equivalent therefor, substantially as described.

I also claim connecting the stirrups or any equivalent therefor with the radially sliding rods by a yielding joint in combination with the oblique edges of the recesses in which they slide, or any equivalent therefor, as set forth, so that the said stirrups when forced out shall be brought in a radial position, and be free to yield laterally to any irregularity of form of the blocks to be griped when drawn in as set forth.

I also claim, in combination with the carrying wheel, or equivalents therefor, for holding and shifting the blocks, the two sets of hollow mandrels with appropriate cutters, and having a reciprocating motion in opposite directions for acting on the opposite ends of the blocks, substantially as and for the purpose specified.

MODE OF ATTACHING ELASTIC SOLES TO HORSE SHOES—Wm. Somerville, of Buffalo, N. Y.: I claim the sole, C, provided with prongs or metallic projections, D and E, or their equivalents, in combination with recesses or rebates, or their equivalents, in or above the shoe, substantially as set forth.

HYDRO-CARBON VAPOR LAMP—Isaac Suggitt, of Providence, R. I.: I do not confine myself to place the arms, B, one inch from the top of the tube, A, as when there is only one arm, it requires to be a little lower than when two or more arms or projections are made. I do not claim a tube alone, but I claim a tube in combination with arms or projections, B, and corrugated hoop, S, substantially as set forth, to be used in any container or lamp suitable for the above purpose.

OPENING AND CLOSING VERTICO-LATERAL FOLDING GATES—Francis Thrasher and H. B. Horton, of Akron, Ohio: We claim, first, Balancing the gate upon a single fulcrum pin, whilst the gate is held to the post, and guided by another pin working in a slot, thus giving a steady motion to the gate in folding and unfolding.

Second, The eccentric quadrant plate, K, by means of which the action of weight, N, and also the action of the hand, (when pulling upon either of the cord, Q or R,) are varied so as to easily set the gate in motion and yet prevent the gate from opening or closing with violence, as described.

Third, The combination of the crooked lever, h, with the spring, J, and cords, L Q and R, whereby a slight pull upon either of the cords, Q and R, will unlock the gate and let it fly open, whilst a stronger pull upon the same cord will close the gate as set forth.

PUMPS—J. D. West, of New York City: I do not claim air chambers with a pump, as they have before been used, but not in so compact or perfectly constructed a form as I have devised. Therefore,

I claim the combination of the air chamber with two inner cylinders and duplicate foot valves, substantially in the manner and for the purpose set forth.

HOLLOW METALLIC LASTS—Sylvanus H. Whorf, of Malden, Mass.: I claim making a last with the yielding or spring instep applied to operate substantially as described,

VARIABLE ECCENTRICS FOR OPERATING THE VALVES OF STEAM ENGINES—S. L. Wiegand, of Philadelphia, Pa.: I do not claim broadly the invention of variable eccentrics; an example of such a device is seen in B. H. Wright's patent, Oct. 26, 1854. In this device the throw of the eccentric is varied by means of a pair of angular arms, which pass through the eccentric. This method does not allow the stroke of the eccentric to be reversed; but in my improvement the eccentricity is at all times permanent, in consequence of placing the whole eccentric at right angles to the direction of the motion of adjustment, and the eccentricity is thus rendered unvarying, while the length and "lead" of the throw can at all times be changed by the simple movement of a lever without stopping the engine.

I claim the arrangement of the double oblique slide, B, upon the shaft, A, said slide passing through the eccentric, C, and otherwise operating substantially as set forth.

MACHINES FOR MEASURING CLOTH—Wm. W. Wythes, of St. Clair, Pa.: I do not claim exclusively the employment of rollers in connection with an index for measuring fabrics.

But I claim, first, The arrangement of the measuring roller, A, with the pressure roller, B, when the latter is hung loosely on a hinged spindle, and acted upon by a spring, and when it is exposed at the end for the admission of the fabric, substantially in the manner set forth.

Second, The combination of the shaft, i, wheel, d, lever, l, shaft, j, wheels, e, and h, numbered plate, m, index, p, and pointer, b, when the whole are arranged substantially in the manner set forth, and for the purpose specified.

MARINE PROPELLING APPARATUS—Ethan Campbell, of Boston, Mass., assignor to Wm. P. Page, of Cambridge, Mass., and Edw. F. Hodges, of Boston, Mass.: Now I do not claim an eccentric cylinder and a wing and valve arranged, so as to rotate together in a cylindrical case, the wing during such rotation being made to slide in a recess formed in the eccentric cylinder.

Nor do I claim the principle of propelling a vessel by an apparatus for forcing jets of water against the water in which the vessel may be floating.

But I claim my improved propelling apparatus, constructed and operating so that its wing cylinder, F, and wing plate, G, may not only simultaneously rise and fall in their case, A, but at the same time have lateral motions in contrary directions, and the wing operate against a space, b, so formed in and applied to the case as not only to be in contact or nearly so with the opposite sides of the wing, but allow the vibratory, as well as the up and down movements of the wing, as specified.

TANK FOR LOCOMOTIVES—John Kimball, of Concord, N. H., assignor to Robert Hale, of Roxbury, Mass.: I claim dividing the water tank into two compartments, thus introducing a trap between the two, for the purpose of intercepting the passage of the oil to the boiler, as set forth.

RE-ISSUE.

LADIES' SKIRTS—E. F. Woodward, of New York City. Patented June 16, 1857: I claim constructing hoops intended for ladies' dresses, substantially as and for the purposes set forth, consisting of a former of any proper material, metallic or vegetable, as described, either with or without a core to support the same, which can be bent into the form of a hoop, and inserted into ladies' skirts, as fully made known.

DESIGNS.

STANDS TO HOLD SHOVELS AND TONGS—Julius Meyer, (assignor to M. Greenwood & Co.,) of Cincinnati, Ohio. Two patents.

Financial Panic.—How to make Remittances.—Sale of Patents.

In the present unsettled state of monetary affairs, a question arises in the minds of many of our readers desiring to make remittances to New York, as to the best and safest manner of doing so. So far as we are concerned, we would state that we continue to accept, for subscriptions, the bills on all banks whose paper is current at the places from whence remitted; but we would prefer that our correspondents would remit bills on banks in New England or New York State.

In making remittances for account of patent business, if sight drafts on New York cannot be procured at the residing-place of the party desiring to remit, we would suggest that he should deposit the amount in the bank nearest his residence, and send us a *certificate of deposit* (which the cashier will readily give) made payable to our order—Munn & Co. This latter advice also applies to parties remitting for clubs of subscribers.

Thus it will be perceived that every facility is rendered to our patrons for remitting to this office; and we hope those who have written us that they are withholding their subscriptions or fees for account of patent business, because they did not know what money we would take, will no longer make such an excuse.

Patents were never in more demand than at the present moment; and while stocks of various kinds are selling for half their *par* value, we have heard of recent sales of patents for very large sums. A letter from Mr. C. B. Sawyer, of Fitchburg, Mass., lies before us, in which he states that he has just sold rights to the amount of *fifteen thousand dollars* on an invention secured through the Scientific American Patent Agency only a few weeks ago!

The Atlantic Telegraph.

The Atlantic Telegraph Company have decided to take the telegraph cable out of the *Niagara* and *Agamemnon* forthwith, and the British Government have given them permission to store it in Plymouth naval dock-yard until it is again needed for practical operations next year.

The Directors of the Company recently commissioned three of the most eminent engineers in England, namely, Mr. Penn, of the firm of John Penn & Son; Mr. Field, of Maudsley, Son & Field, and Mr. Lloyd, chief engineer of the steam department of the British Admiralty, to make a thorough examination of the cable, and all the appliances for submerging it, and to report the result with such recommendations for future guidance as they might deem advisable. These gentlemen, in company with Mr. Everett, the chief engineer of the *Niagara*, performed the duty entrusted to them in the most thorough manner, and came to the unanimous conclusion that, with the substitution of a patent self-adjusting break (by which it is impossible that the cable when paying-out can be broken) for that previously used, and some modification in the paying-out machinery, there is no reason to doubt that the next attempt to lay the cable will be crowned with triumphant success.

In regard to the report that telegraphic communication between the *Niagara* and the shore was suspended for several hours prior to the breaking of the cable, we have an authoritative contradiction. It seems that for a short time in the evening before the accident, the operators at the shore end of the line thought it unnecessary (having nothing to say) to send any message to the ship, although they were constantly receiving dispatches from it, hence the impression prevailed on board that the line had ceased to work; whereas a subsequent comparison of the records kept on shore and on the ship showed conclusively that the insulation was quite perfect until the cable broke.

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A Peep into a Welsh Coal Mine.

BY SEPTIMUS PIESSE.

Mining districts generally are situated in the most romantic and picturesque parts of the world. This is more particularly the case in "Merrie England" and the "Land of the Leek." Thus Wales and the bordering counties have ever been prominent as affording a harvest to mining speculators, who, mole-like, grope below the earth, and as a resort for the lovers of scenery, who admire the surface only. Mountain and valley are to one what the monotonous ironstone and coal beds are to the other; the one will praise the sparkling of the lead or copper ore, the other admires the glistening of the dew-drop upon the hardy fern, and the bubbled torrent as it hurries on its course down the Salmon Leap.

Having passed the green and golden colored fields, bordered with the trim hedge row of black and white thorn, with here and there a wild rose or blossom of woodbine peeping at heaven through the green leaves, then the soft sward, yielding a dainty meal to the lowing cattle and the bleating lamb, then the road side decked with azure harebell and blooming furze—there was the logged mule feeding at will upon nettles; all was bright, was gay, was rural.

Now the scene is changed to engine houses, lofty chimneys, sheds, stables, cabins, hills of coal, of coke, of rubble; piles of rough timber, broken machinery, loose chains, and a thousand other things apparently scattered about, rusty, dingy, black; and well they might be, for the coke hills and chimneys were foaming with smoke, and appeared as though they had been doing so for ages. The clanking of chains, the screeching unlubricated wheels, the waste steam blowing from the boiler valve, and the echoes from the pit's mouth, form together a sight and sound that few can conceive or form even an idea of, if accustomed to a "quiet house."

As we examined the works, we could not but be forcibly struck with the apparent negligence and exposure of all sorts of machinery in full work, wheels revolving, beams oscillating, ropes and chains being wound and unwound, pumps flowing with muddy water, all, as it were, unheeded. Everything about a mine seems to be done for work, and nothing for show, so everything is wrought of the strongest material, but in the roughest way man can put matter together. As the engines are never stopped but for twenty-four hours in the week (that is from six o'clock on Saturday to the same hour on the Sabbath following), they are put to severe tests for labor, and which if deranged throws many men out of employ. They are, of course, constructed in the simplest and strongest way; so little "tackle," indeed, is there about them, that they are often driven by a boy engineer.

Having viewed the miscellaneous works, we had some conversation with one of the "top men," which ultimately led to our descent to the "lower regions;" the terms were very moderate, having only to "stand something to drink." The miners are willing to do anything for strangers for a trifle. It was suggested that we should put on a "smock," which ultimately we had no reason to regret. With our new garment came a little of the excitement of our situation. We could not keep away the thought, should the rope break, or a wheel go wrong, what would become of us? Fearing lest our nerves should fail, we hastened, under the direction of our new friend, to jump into the *corve*, just then about to descend; two or three miners did the same, and in a second the engine, like a mighty giant lifted us all up about four or five feet, and held us dangling over the pit's mouth; at the cry of "hold on!" the engine was reversed, and we began our descent in earnest. We certainly own there was a thrill—the "goose flesh" crept up our back—when we thought of the eighty-five fathoms of space between us and a sure footing. The descent being very slow, we had plenty of time to examine the shaft; it was strong enough no doubt, but we thought it rather shaky, as the bricks had fallen away here and there, and water was pouring through to no small extent. Having descended about thirty or forty fathoms, the mouth of the pit or shaft began optically to decrease in size, and the rope by which we were held did the same, till having gone down about sixty fathoms, we could no longer discern either; we could, however, trace the rope or band by the light of the candle with which we had provided ourselves, till it appeared as fine as a spider's thread. The further we descend, the less steady we go, the oscillations become greater, we swing from side to side, and, occasionally the corve catching against some projection, gives the whole a lift—far, very far from pleasant to those unused to such treatment—and having made rather more than half the descent, we felt as we think a person might feel were they in Mahomet's coffin—a kind of suspension between heaven and earth—only not supported by ether, by magnetism, or gas, but by a cobweb. Still we continue to descend. Now, the echo of voices are heard from below, reverberating gruffly. We have passed the superficial crust of the earth, and bricks are no longer required for support, the shaft being cut through rock of "slaty shale," as the geologists have it, which is mostly the strata that covers coal. Now the glimmer of light is visible, it becomes more distinct, and faces (not so black as you would imagine) come in view.

Now, thank our stars! there is an end of our suspense, both ideal and real; we are landed, as an æronaut might say when his car had touched the earth, safe and sound. We are at the bottom at last. An archway leads to a considerable excavation, large enough for a wagon and horses to turn round; from this the galleries, as the lesser excavations are called, emanate like small streets from a circus; down one of these we were taken to the stable—a part of the mine that had been exhausted. The horses were in excellent condition, they are of the low cob breed, as best adapted for their situation. When once they are taken down they rarely, if ever, are brought up again, and are even buried below in some instances; of five we saw, one had been down seven and another eleven years. Having satisfied our curiosity here, we turned back to the road or main colliery.

In order to save labor, no more material is cut away than is absolutely necessary. In this mine the coal seam is not more than four feet thick, (the seams vary from eighteen inches to twenty feet), so that measurement may be said to be the hight of the workings, which prevents one walking in an upright position. We traversed along this about half a mile, when the sound of the pick and sledge warned us we were near the workers. A turn from this brought us at once to what is called the "wall face," from which coal is actually brought down; here were seen about twenty men in line on their knees and haunches, in full labor, each having a lamp giving no more light than, as the saying is, "to render darkness visible." While here, we could, of course, do no less than mine some coal ourselves, in order to give a charm, as it were, to the visit; and, dear readers, from the little experience we had, we can assure you that the miner's work is not to be envied, especially when we take into consideration the dangers of this occupation—dangers which, in their consequences, may be compared to the mariner's: to-day, he is full of hope, of life, of vigor; to-morrow, a widow and fatherless children weep his loss. Yet the miners, like the sailors, as a body, are a hardy, contented and courageous class of God's people. Having done our work, we withdrew, happy ourselves, but leaving those happier behind us.

The mode of working a coal mine is not sufficiently interesting to the general reader to be detailed here. We may observe, however, *en passant*, that the men work by the piece; that they are divided into classes under the name of "holers," "getters," "butty-men," "trammers," "rolley drivers," "banksmen," &c.; that when the coal is "got," it is shoveled into the corve; the corve (generally two at a time) is raised on the rolley (a kind of truck), and are drawn to the pit's bottom; a corve is then attached to the apparatus by which it is brought up the shaft, and is then consigned to the banksmen; and that long night to which the coal has been inured is terminated with a bright day, and the sun, from which it has been hidden for ages, again shines on it.

In some cases, the coal is drawn from the wall face by manual labor to the mouth of the shaft, but in most instances by horses, under the guidance of a boy or girl carrying a lantern dimly burning. It is usual to have a tram-road or railway for the rolleys or trucks to travel upon, and it should not be forgotten that this mode of transit was in use in the mining districts many years before applied in the general way we have it now.

Besides the falling of the superincumbent earth, which in some cases buries them alive, the miners have to task their ingenuity to combat with one of their greatest enemies, namely, the fire-damp. Though some mines are comparatively free from this evil, there are others that have it in excess. This fire-damp is nothing more than what we of the "upper world" call gas-coal. It issues from the coal as it is mined, pours out in jets like those which we daily witness in a miniature degree at home at our own fireside; mixing with the air of the mine it becomes very explosive if not carried off by good ventilation. Mines that are dangerous on this account are obliged to be lighted with a peculiar kind of lamp called the "Davy," which prevents the gas being ignited on the outside, but warns the miner of his danger by the appearance of the flame within the lamp should the gas be in excess. In the ordinary way, common candles are used which the miners are apt to burn when they should not, because they give more light than a "Davy." Good ventilation will, however, subvert the evil of fire-damp, and in order to carry this object out, they generally sink two shafts to each mine; they then make a large fire in one, which, acting as a flue or chimney, causes a draft of fresh air to descend the opposite shaft and to pervade the mine.

I have proposed to illuminate mines by gas. It is somewhat singular that these dark regions should be the last to receive the benefit of that artificial light of which they are the source. Many of the sad accidents which now happen in the mines are indirectly produced by the want of light by the miner, and there is no reason why gauze-protected gas lights should not be used in place of the miserable "glims" now employed.

Besides fire, the miners have also to contend against water, but this is kept away by powerful pumps; that, however, overcomes them for a time occasionally, still further testing their patience. The strata of coal in the majority of mines is not on the level, but "dip" to a considerable degree; in these cases different modes of working are obliged to be had resource to.

When we found there was nothing more to be seen, we made preparations to ascend, which having effected in safety, we must own there was a degree of pleasure felt in again treading the surface of terra-firma.

The origin of coal we cannot here discuss, but it is generally admitted to be the result of some wood or forest that has been laid low during some great change which the surface of the earth has been subject to in a previous age. There is not the least doubt that the present position of the globe has been entirely changed with regard to the relative position it had to the sun in former times, and as a consequence, the surface of the world has been modified with this alteration, either suddenly or through the lapse of ages—more probably the latter.

In all His works there is evidently an object in view by the Creator. We cannot for a moment contemplate these mighty cellars of nature without perceiving at once that they are a superb provision for man's wants; nor could we, both on account of its value and *its composition*, have given coal a better name than that which it has—"the black diamond." This wise economy of the Great Author of nature is a great proof of his infinite beneficence.

Parasitic Insects.

When in the summer heat we have been teazed so much by mosquitos, and our hands have been busily employed in their destruction, we little thought that they were not only useful, but agreeable creatures, and we are afraid that few of our readers will sympathize with (although they may allow the truth) of the following communication from one of our correspondents, H. Pollard, of Lexington, Mo.:

He says:—"That it is a law of nature that animals make more blood in the summer than is requisite for them, partly from the luxuriance of their food, and partly from the genial atmosphere of the season. If this blood does not find some outlet, either by perspiration or other means, the result is in all animals alike, namely, fever and derangement of the system. Now, the very season when this effect is most liable to be produced, is the very time when the parasites are let loose upon us, and perform for us the operation of blood-letting with but little inconvenience, and very cheap."

He certainly supports his argument with some very strong facts, as for example: "The dog, whose food is the same throughout the year, is always accompanied by the parasitic flea, while the horse, with other animals, and man, are only infested by them in the summer season, when the nature of the food they consume requires them to have blood-letting."

This is very true, and no doubt mosquitos, in common with all created things, have their use; but somehow we cannot refrain from wishing they would fulfil their mission on some other person than ourselves.

The Barometer a Hygrometer.

MESSRS. EDITORS—Your correspondent J. H. P., in describing a device under the head of "a cheap barometer for farmers," mistakes when he supposes that his ingenious contrivance necessarily measures the *weight* of the atmosphere; it only measures the quantity of *moisture* present. The substances suspended to the short arm of his lever absorb by exposing an extended surface to the action of the air. His instrument is more properly a hygrometer. The barometer indicates changes of weight in the air, whether resulting from moisture or other cause. The instrument described would "indicate the change of weight" of the air very well, were that due only to the moisture present. J. G.

Augusta, Me., September, 1857.

Population of Canada.

According to the census taken in 1851, the total population of Lower Canada was 890,261, and of Upper Canada, 952,265. On the 1st of January, 1857, the estimated population, based upon official returns, was, of Lower Canada, 1,220,514, and of Upper Canada, 1 350,923, making a grand total of 2,571,437, showing an increase in between five and six years, of 729,172.

Cleaning Saddles, &c.

The following is a good recipe which will give saddles and bridles a good polish, and be entirely free from all stickiness:—The whites of three eggs evaporated till the substance left resembles the common gum, dissolved into a pint of gin, and put into a common wine-bottle, and filled up with water.

Within the three months just past, eight million six hundred thousand new cents have been issued from the Mint at Philadelphia, the total weight of which would be forty-three tuns.

No man knows what powers he has till he has tried them. And of the understanding, he may most truly say that its force is greater generally than he thinks till he is put to it.

The electric light is four times less brilliant than the direct light of the sun.

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New Inventions.

Correction.

There is a slight mistake in our description of Bachman's Corn Husker, an engraving of which appeared on page 20 of the present volume, which we now correct.

The trough G, does not deliver the corn on platform I, but delivers it into the screen, and the husking is performed by the teeth on the board, I, which draws them through between the wires of the screen; and the rake teeth, H, are for clearing the husks from the teeth of the board, I.

Improvements in Hosiery.

William H. McNary, of Brooklyn, N. Y., has recently secured a British patent for a certain mode of operating machinery to form the heel of a piece of hosiery, and also the toe, if desired, of a properly rounded or partly spherical form, without a seam, by knitting continuously from the leg towards the foot, or from the foot towards the leg, without removing the work from the needles. The invention is most advantageously carried out by means of the circular knitting machine, as by it a perfectly seamless well-shaped stocking may be produced. In the circular machine, the leg is knitted, in the usual manner, to the point where the heel commences, and a row of stitches, or two or more rows, if the machine is constructed to knit two or more rows together, as is sometimes the case, is knitted half round the leg and at the back thereof, leaving the other half of the stiches on the needles. A second row of stitches is then knitted in the opposite direction on the row just completed, one or more loops or stitches being dropped at each end thereof. A number of rows is then produced in like manner—the last stitch being left on the needle on which it was formed—until a piece of knitting forming a quarter, or other requisite portion of a sphere is produced which conforms to the natural shape of the human heel. After the knitting in the above manner has been carried on as far as desirable, which is generally till the row is reduced to a very small number of stitches, the knitting commences again all the way round the needles, which can be done at the end of any row knitted in the aforesaid manner, as there is always the same number of stitches on the needles.

The above improvements were secured by letters patent through the Scientific American European Patent Agency.

Patent Bottle Imp.

The subject of our engraving is an ingenious and simple device for cleaning bottles of all sizes and kinds, and more especially applicable where there are a great number to be cleaned.

It consists in a frame of iron, A, in one end of which is an ordinary lathe head, B, through which there passes a mandrel, C, having a pulley, D, mounted on it. This is turned by a strap, E, from a treddle, F, and fly wheel. The mandrel is hollow from *a* to *b*, and the remainder to the end is semi-circular, as will be better seen at C′, Fig. 2. In this hollow there slides a square rod, fastened by a pin through a slot in C, at one end, to the wheel, H, which fits into a slot in the piece, G, and at the other end carries the brush mounted on the three pieces shown at S S S.

I is a casting carrying G and J, the handle by which it can be moved up and down the bed of the machine. K is a spring pressing against I in such a manner as to keep the brush, S, always closed and lying flat, as seen in Fig. 1. M M are guides, on which the frame, L, that carries the bottle, can slide.

The operation is as follows:—The bottle which has been taken out of water, and still containing a little, is placed in the frame L, and moved forward so that the brush in its flat form is inserted; a rapid motion is then given to it by means of the treddle, and the handle, J, pushed so as to open the brush, as seen in Fig. 2. This presses it against all parts of the bottle, whatever its shape, and thoroughly cleanses it. When clean, the handle is released, the spring carrying the brush into its normal condition, and the bottle withdrawn and rinsed. It has been used by Messrs. G. W. Weston & Co., of Saratoga Springs, some time, and has given them the greatest satisfaction. One of these machines is now on exhibition at the Fair of the American Institute, Crystal Palace. This invention was patented September 1, 1857.

For further information or particulars address H. N. De Graw or Hiram Wilbur, Green Island, Albany Co., N. Y.

DE GRAW'S BOTTLE WASHER.

Fig. 1

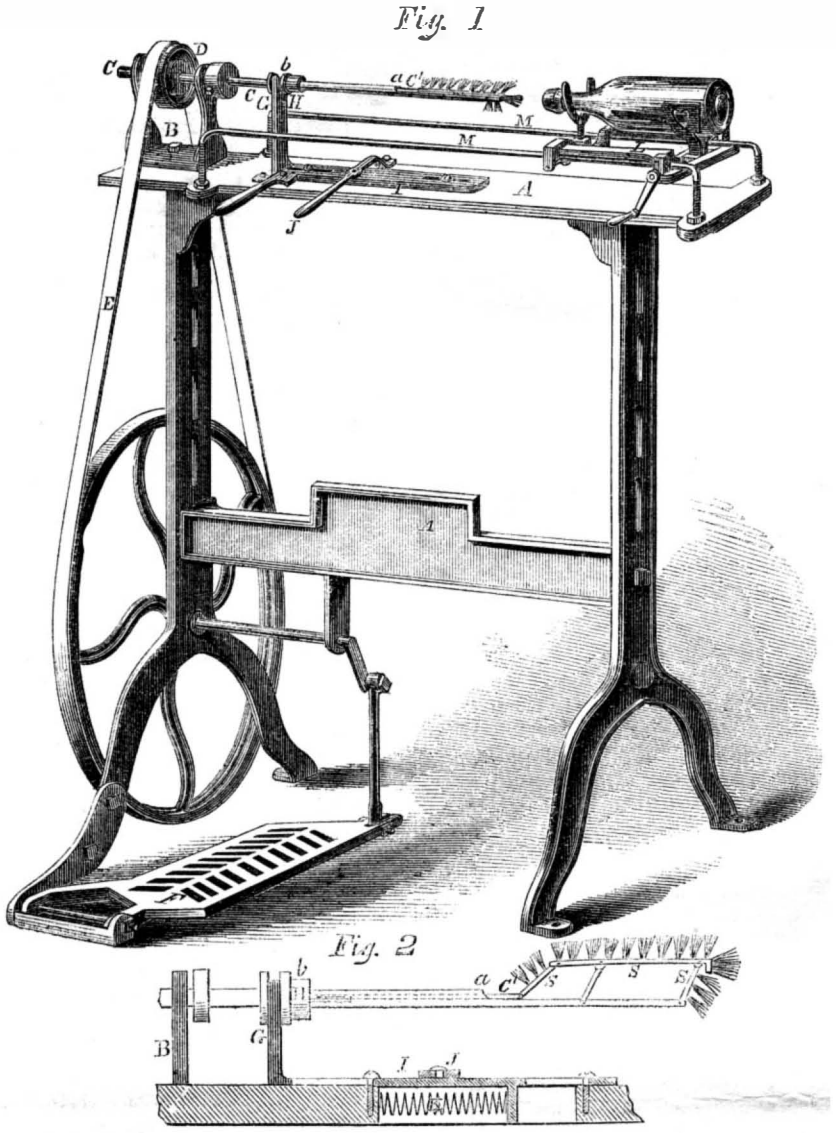
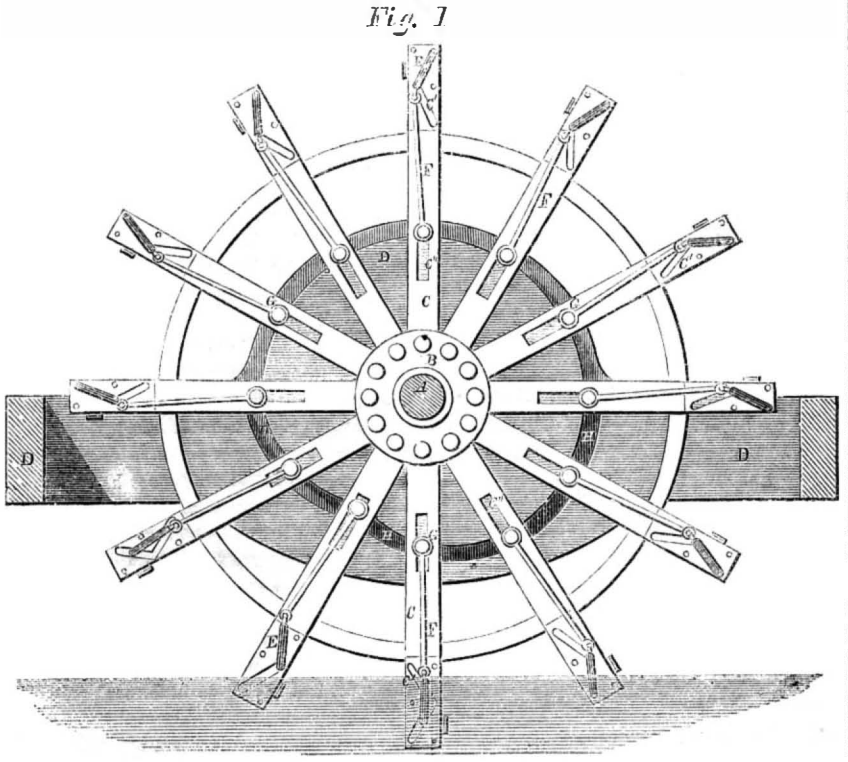


Fig. 2

FISHER'S IMPROVED PADDLE WHEEL.

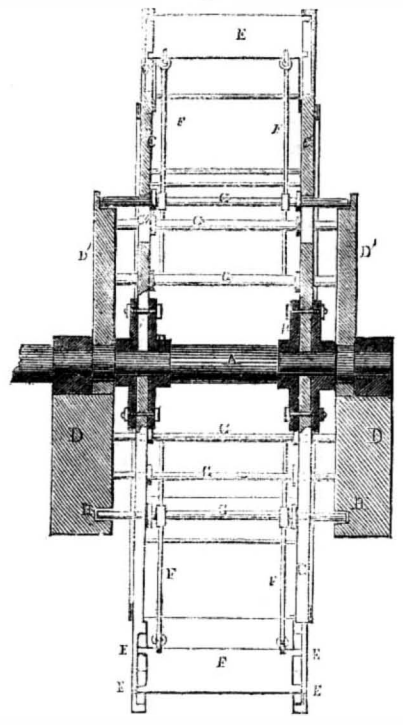
Fig. 1



The buckets or floats of an ordinary paddle wheel are fixed rigidly to the arms of the wheel, and many persons think this a great objection, as they take up when coming out of the water a certain amount of what is called "lift water." This is supposed to retard the speed of the vessel. Numerous inventors have attempted to overcome this evil by introducing feathering buckets, and each improvement that has been suggested seems only to aim at some new mode of accomplishing this feathering. Inventors who succeeded in conquering the "lift water" evil have generally added the greater one of friction. From so great a number of appliances for this purpose, we can scarcely prophesy the future of the one we are about to describe; but when it comes to have a fair and practical trial, we hope it may be successful.

Fig. 1 is a longitudinal section. Fig. 2 is a transverse section of this arrangement. The paddle wheel has an axis, A, to which the arms, C, are fixed, by means of the center plate, B, and the whole is mounted in the frame, D, on the sides of which are the elevations, D′, and on them are supported the

Fig. 2.



grooved cam, H, it being fixed. In the end of each arm is an angular slot, C′, and in it the bucket, E, has room to play. The side of the bucket nearest the axle is loosely attached to the bars, F, which are again connected with the crossbars, G, and these work on the cam up and down the slots, C″.

The action is as follows, and will be understood by referring to the lower part of Fig. 1. In the first instance, the shape of the cam acting on the bar, G, keeps the bucket in the lower part of the slot, C′, so that on entering the water it presents a face exactly at right angles with the surface, and this is the condition which is maintained while immersed, and when it comes out of the water, it being still in the same position, no "lift water" can be taken up. However, it does not remain long so, as by the shape of the cam, it goes through the changes of position shown in Fig. 1 in reference to the arms, by moving up and down the annular slot, C′, and again takes the position in which it will have to re-enter the water at the next stroke. The inventor has applied for a patent.

For further particulars, address the inventor, Jos. H. Fisher, Placerville, California.

Prospects of a Patent Quarrel.

The various sewing machine interests in this city are evidently preparing for an interesting legal fight, if we may judge from the preliminary examination now going on in this city. Testimony is now being taken on a question of alleged interference, to which Watson with his famous ten-dollar sewing machine, Wheeler, Wilson & Co., Singer & Co., and probably others, are more or less involved.

It is calculated that this examination will last three weeks at least. One witness alone was tortured three days by a hectoring set of lawyers who will probably make quite as much money out of the operation as their clients. If these various sewing machine manufacturers wish to understand their best interests, they will take our advice and keep out of the lawyers' hands.

Compromise by all means; and do not, for pity's sake, lumber up our courts with a "vexed suit," which is likely to have as many turns as the famous india rubber case, Day *vs.* Goodyear or that of Jarndyce *vs.* Jarndyce.

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Scientific American.

NEW YORK, OCTOBER 10, 1857.

Disasters in Business and Finance.

The present financial condition of the country is a somewhat anomalous spectacle. Like a fierce tempest it came unexpectedly, and in its ravaging progress it has swept away many a fabric which, to all appearances, seemed prepared for the roughest assault. Many moderate and some large fortunes, accumulated, probably by speculation, possibly by industry, but scarcely by toil, have been scattered like the leaves of autumn; and, step by step, terror and even paralysis have been carried into and over the industry of the country. We say it is an anomalous spectacle, first, because of its sudden action, and second, because it came upon us at a time when we were comparatively out of debt, and in full realization of one of the most luxurious crops ever bestowed by the Lord of the Harvest.

There are various causes for this sudden check upon our progress, which the wise ones will be busy in ferreting out; and each in turn will proclaim himself a prophet *not* without honor, save in his own country. No doubt, as a people we have been sadly improvident of our means. In the general race for wealth, there has been over-trading, over-acting and over-straining. Among the prominent causes we may enumerate the extravagant love for silks, satins and furbelows, to adorn and beautify "the human form divine"—imaginary coal, iron, copper, gold and silver mines—opposition railroads, and railroads without opposition or business—corrupt legislation, and a sort of general rush into everything, real or speculative; so that, at last, we find to our discomfort that we have "paid too dear for the whistle." These combined evils have prostrated confidence, and it will no doubt require considerable time to restore it to a healthful condition. Moneyed institutitions have been made to suffer severely from this lack of confidence; and, as a consequence, many of them have been made to succumb to an excessive pressure of their notes for redemption. The soundest of these institutions have been compelled to plant themselves upon the defensive; and they are thus unable to extend credit and accommodation to the people at a time when it is most needed.

The overflowing graneries of the West require to be depleted. Europe wants food, and must have it; and if, upon every evil report, our people are determined to "run on the banks," and lock up the specie, they must be satisfied to wait until means can be brought from across the water to open the channels of trade, and thus suffer the produce to flow to the sea-board. In such a time as this, there is a personal duty to be discharged by all; and although, in our editorial capacity, we seldom depart from the duties to which we have hitherto devoted ourselves, yet we now feel called upon to utter a caution to our readers, not to allow themselves to catch up and echo flying rumors which may in any degree fan the already fiercely burning flames. Many upright and honorable business firms and many sound and reliable banks have been ruined by unfounded rumors against their credit; and certainly there is great need of caution in this particular.

We repeat what we said a few weeks ago, that *confidence* is the mainspring which governs the movements of business; and the sooner it can be revived, the better will it befor all the industrial pursuits of the country.

Gutta Percha and its Uses.

This article of commerce is but a recent introduction, and although it has had but about eight years' trial, it has taken a place among the necessaries of life, and, as such, become an important object of trade. It is the concrete or hardened juice of a forest tree, which grows on the shores of Malacca, Borneo, and adjacent places, and its valuable properties were known to the natives long before Europeans or Americans were cognizant of its existence. Many persons confound it with india rubber, but they are botanically and physically different, and the only semblance between them is that they are often put to the same use. We may enumerate a few distinctive characteristics, as well as those in which they are alike. They are both vegetable substances, and are obtained by making incisions into the trees in damp weather, when the juice flows out; but they are two very different trees in their botanical relations, and when dried become substances totally diverse in their qualities. The india rubber is perfectly elastic, and is very sensibly affected by heat and cold; and when once it has been heated, loses all its original properties, and becomes a dirty, sticky mass. Gutta percha—*gutta* being a Malay word, signifying gum, or juice, and *percha* is the name of the tree; the *ch* is not sounded as K, but as *ch* in "perch"—is capable of being heated and pressed into molds of any shape, and takes the most delicate impressions, and when cold possesses all its original peculiarities. It is not affected by acids or oils, and is only dissolved by a liquid called bi-sulphide of carbon, and some mineral fluids. When made into articles of household use, it has the advantage of not being liable to breakage. It is remarkably strong; some pipe made of it by S. C. Bishop, of New York, ¼ inch bore, sustained a pressure of 720 pounds to the square inch, and only burst at 760. There is scarcely an article of use or ornament for which it is not fitted, as almost everything can be made of it—coats, jackets, capes, pantaloons, overalls, leggins, aprons, caps, and clothes of all fashions and kinds for warming this "human form of ours," in the most pitiless storm, or the coldest weather. Cloths of all shapes, and for all purposes, camp blankets, horse covers, traveling-bags, knapsacks, canteens, beds, cushions, life-preservers, water pails, fire buckets, fire-arm cases, handles of surgical instruments, and sundries of such variety and extent of application that they would *really* be too numerous to mention.

One of the most novel applications of gutta percha is the rolling of it into sheets of about the thickness of ordinary printing paper; we have in our office a number of the SCIENTIFIC AMERICAN printed on it, and right well it looks—the theory and practice of science and art being stamped one upon the other. Machine belting is manufactured in large quantities of this material, and is found to answer remarkably well, as no heat under 300° Fah. affects it, and it remains flexible under the severest cold, and possesses great strength. As tubing it is unsurpassed by any substance, and will not corrode and injure the water or other fluid, as does metal; as we all know, it is an admirable insulator, being used for submarine cables. The gentleman we have mentioned above (S. C. Bishop,) has taken out a patent for covering the gutta percha coated telegraphic wire with a perfect metallic tube, thus affording additional protection from fishes and the bed of the ocean. Mr. B. has a stall of goods manufactured in this substance at the Crystal Palace, which will well repay a visit; and when we consider that attention was first called to gutta percha by Dr. Montgomerie in 1843, and that since that time it has spread over the whole globe, and taken a position as an article of commerce, utility, and ornament from which it cannot easily be displaced, we cannot regard its progress as any other than unparalleled in the history of applied science.

Printing Specifications and Drawings.

It was proposed in the Patent bill of Senator James, as reported during the last session of Congress, to publish the specification and drawings of each patent, in full, at government expense. This scheme had its foundation in the system adopted by the English law of 1852; and it was thoughtlessly believed to be both feasible and useful. It had a very pleasant look about it; and, like the sugar-coated pill, its surface did not at first view expose the bitter drug beneath. In our examination of the proposed bill, on page 133, Vol. XII., SCIENTIFIC AMERICAN, we laid bare the whole matter, and the opinion then expressed has been fully sustained by the recent *exposé* of the English system. To enable our readers to form an opinion of the magnitude of this undertaking, and to show the absurdity of any attempt to adopt it here, it is only necessary to state that, since 1853, the enormous sum of $600,000 has been expended by the English Commissioners in printing the specifications and preparing drawings of English patents, and only the paltry sum of $20,000 have been realized from the sales!

We cannot understand how it is that the enlightened British government continues to permit this useless waste of the Patent fund. It has already invested sufficient money in these blue-covered pamphlets to build a very respectable Patent Office—at present a positive necessity in England. Now, while we are in favor of the widest diffusion of useful knowledge, it strikes us that this is decidedly an extravagant method of accomplishing the object. Our excellent cotemporary, *Newton's Journal*, intimates that the publications, if properly managed, might, by their sale, be made to clear nearly the whole expense; but it will probably look in vain for a well-managed government printing house.

Changes in the Patent Office.

Our Washington correspondent informs us that Dr. Gale of the Chemical Department of the Patent Office, and Mr. Lane, of the Household and Telegraphic Class, have been removed from their positions as Chief Examiners, and that Horatio King, of Louisiana, and James S. French, of Virginia, have been appointed to supply these vacancies. Mr. Schaeffer, who has obtained considerable notoriety among inventors of railroad improvements during the last few years, has been transferred to the Chemical Department, and one of the new appointees takes his Class. We think this latter change specially fortunate, for we understand Examiner Schaeffer has superior practical knowledge of chemistry as applied to the Arts, which will render him a useful Examiner in this department; while the room which he has left cannot be managed in a more illiberal manner to the inventor than has lately characterized it. It had become to be a by-word, that the applying for a patent on a railroad improvement was synonymous to its rejection; and for a year past, we have not advised inventors to attempt to obtain patents on inventions which we knew would come under examination in this department. A better day has dawned, we trust, for inventors of railroad improvements.

The Twenty-ninth Annual Fair of the American Institute.

THIRD WEEK.

The number of visitors is rapidly on the increase and every evening the Palace is quite crowded, while the enlivening strains of a good brass band keep every body in a good humor. Nearly all the departments are now filled up and the whole presents a scene of activity and interest. No one can walk through the building without feeling a particular interest in something or other on exhibition. Mechanism for the mechanic, house fittings of all kinds for the builder, agricultural implements and fruit for the farmer and gardener, carriages for the opulent, tools for the workman, articles of all kinds for the ladies, and lastly, toys and confectionery for the children; who would not go and take their families to such an amusing, varied and instructive treat as this? This week, strolling among the machinery in motion we were suddenly startled by our boots being wet through by the force of some pump whose delivery pipe had been turned accidently on to us and thus suggested the idea that we would say all there was to be said about the

PUMPS.

Carpenter's Rotary Force Pumps have been long in use and seem to command general attention; they are very compact and it is said that one having a cylinder only 8 inches in diameter is daily throwing a column of water 1 inch ⅜, 65 feet high, at some large works where it is in use. They are manufactured by John Patterson & Co., 61 Fulton street, this city. See engraving of this pump on page 244, vol. 10, SCIENTIFIC AMERICAN. Andrew's Patent Centrifugal Pump is one of the best we have seen, it works steadily and quickly, and one having a piston 9 inches in diameter, making 700 revolutions a minute, is stated to throw 25 barrels of water in the same time, 3 feet high through a 3 inch discharge pipe. An engraving and full description of this excellent pump will shortly be published in the SCIENTIFIC AMERICAN. Patents for Europe were secured for it through this office. Silsby, Mynderse & Co., of Seneca Falls, N. Y., have a rotary power pump and several hand pumps on exhibition; engravings of them having been previously published in our columns with description, comment at present is unnecessary.

The hand, suction and force pumps of L. P. and W. F. Dodge & Co., of Newburgh, N. Y., are worthy of attention. With a trifling amount of labor they deliver a good steady stream of water, and as the valves are composed of two india rubber balls working in ron cages which are part of the piston, they are not likely to get out of order.

A. Tower, 124 Broadway, New York, exhibits various sizes of double cylinder power and hand pumps, which are apparently very effective and strong. An engraving of this pump may be found on page 68, Vol. 10, SCIENTIFIC AMERICAN.

A. C. Cary, 267 Broadway, New York, has a rotary force pump and fire engine which, with a suction pipe 5 inches in diameter, a delivery pipe or hose 3 inches, a face of 8 inches and piston in proportion, is said to raise and discharge 200 gallons of water per minute; this pump is worked by steam and may also be worked by hand.

The Chronometer Steam Pump of Ruperts, Crumbie & Co., Brooklyn, N. Y., professes to be more compact and steady than any other at present made; it has two force or pressure chambers and 4 valve seats; it is said to throw a ⅝ of an inch stream 120 feet high with a piston 4½ inches in diameter.

Blake, Wheelock & Co., of 71 Gold street, New York, have one of their steam pumps at work, and although not very large, it appears to work with ease and rapidity.

The Steam Pump and Fire Engine of Taylor, Campbell & Co., Brooklyn, N. Y., has a large fly wheel attached which steadies the motion and ensures regularity of stroke. One of their pumps having a piston 10 inches in diameter will, it is stated, send two streams of water, each 1¼ inches in diameter, 125 feet high, and the jets which are continually pouring from the delivery pipes are strong, regular and clear, indicating a perfect action in the pumps.

The Steam Pump of C. & G. M. Woodward has also a fly wheel attached and works with ease and freedom. With a piston 7 inches in diameter one of these will deliver 240 gallons per minute, so we are told.

Guild, Garrison & Co., Williamsburgh, N. Y., have one of their steam pumps in operation feeding one of the boilers of the Palace. These pumps are capable of the nicest regulation and are excellent of their kind; one of them now put up with a piston only 7 inches in diameter is said to draw up water from a well 29 feet deep and throw it in a stream 1 inch in diameter 96 feet high. See engraving on page 105 Vol. 12 SCIENTIFIC AMERICAN.

H. R. Worthington, Broadway, New York, exhibits one of his celebrated pumps, which are the favorites of many practical mechanics, and as they have been tried so long and done so well, what can we say except that we hope them continued success?

We have now mentioned all the pumps of any note in the Palace, and we would simply add that we have stated in each case (where we were able to obtain the information) the

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amount of work each can do; but as these are the statements of the exhibitors themselves, should there be any inaccuracy it will be their fault.

In this same section of the building there are half a dozen or so rival inventors of fire and steam regulators, close together, and as these are now in actual operation on the smoke pipes of various boilers in the vicinity the competition of the exhibitors is strong.

A Fire Regulator, it is well known, is a contrivance for so moving the damper of a smoke pipe, or pump valve, that when the steam attains too great a pressure the damper shall be closed, thus hindering the fire from making more steam than is required. This is effected by a valve box, which communicates by a small pipe with the boiler, on the top of the valve rests a metal plate and this lifts, when raised by the pressure of steam within a weighted lever, which in its turn elevates or depresses the bent arm of the damper. Now the various modifications of this common plan are: first, one by Patrick Clark, who maintains that, by a peculiarly shaped lever, he can control any sized damper; he moves the fulcrum as the size of the damper increases, thus obtaining the power required. This invention is owned by a company. E. R. Pratt is secretary, whose office is at 229 Broadway, New York. See engravings on page 281, Volume 9, Scientific American. The peculiarity of Patrick White's is that his valve is square or rather rectangular in shape, and is composed of one piece of rubber tubing, the valve seat is also oblong and acts by a force free to move so that it can always remain perpendicular. His address is 10 Water street, Brooklyn, and he has a large placard posted up to inform the public that his regulator "needs no blowing."

Timothy Clark adopts either a rubber valve or a metal one—his metal one having the shape and form of a pair of circular bellows, and is certainly sensitive to a high degree. He claims to be the original inventor of fire regulators, his patent extending back to 1847. His address is 206 West 37th street, this city.

William S. Gale, 91 Elizabeth street, New York, has a simple Regulator. It consists in a simple plate of india rubber and a metallic one underneath. The valve seat rests on the rubber, and works with freedom and ease. It can be repaired by any mechanic when worn, and is not liable to get out of order.

The "Conical Volute Car Springs" of the New York Metatlic Car Spring Co., No. 227 Broadway, New York, are strong, light, and work without friction, as a space is left between each coil of the spiral, thus rendering them perfectly elastic. We saw one weighing only twenty pounds, perfectly elastic under a pressure of 13,500 pounds, which it bore with ease under a concussive strain.

The Hadley Falls Co., of Holyoke, Mass., have a magnificent array of stamping, punching and cutting machinery for iron, manufactured under Dick's patent. They look massive, as they are, and plainly say "We are for use, not ornament; give us steam and iron, and we will show you what we can do." We saw evidence of their power in the perforated thick metal plates under the punch, and scraps cut from thick plates under the shears.

"Atmospheric Hammer," by Milo Peck, of New Haven, Conn. See engraving and description on page 137, Vol. 11, Scientific American.

J. H. Coller, Poughkeepsie, N. Y., exhibits a case of machine-cut files, which are very good specimens of their kind, the cut of the teeth being regular and equal.

The harness of a loom is a frame having a number of strings knotted so as to form a loop in the center, passing from side to side, and through each of these loops a thread of the warp passes; when weaving, these harnesses are alternately lifted up and down, by means of a treddle, and thus elevating a portion of the warp, forms a space for the shuttle to pass through. There is here a pair of harness made of thin copper wire, which is, apparently, better than twine, as there is less friction. It is said that they are not so liable either to cut or wear the warp thread. They are made by M. Finkle, Broadway, New York.

The Clinton Wire Cloth Co., of Clinton, Mass., display some wire cloth woven by power looms; it is a very firm and well woven material, and can, no doubt, be turned out very rapidly. The particulars we could not learn.

We do not know whether the cities of the United States are this winter to be infested with the gangs of garotters and burglars that have occasionally visited us, but should we be obliged to resort to self-defence, we know not a better weapon than "Buckman's Cane Gun," which is decidedly the novelty of the firearm department. It is a simple hollow cane, which can be used as a pistol or rifle, is not liable to go off accidentally, and is immediately ready for use. It can be loaded with powder and ball in the ordinary manner, or with a loaded bullet containing fulminating powder, as in breech-loading firearms. No one would suspect a gun was concealed in such a slight walking-stick, and every part is sufficiently strong. Ira Buckman, 95 Bank street, this city, is the patentee.

ELECTRIC TELEGRAPHS.

Of all inventions that have originated in the mind of man, that of the electric telegraph has taken, and for all future time must maintain, a most prominent place. Its blessings and benefits are common to all, and its source of power is as unfailing and bountiful as the broad domain of nature itself. The telegraph, as now in use in our country, is simply made the medium of communication for business necessities or friendly salutations. But it may be made to subserve the dearest interest of the thousands that travel upon our many railroads, by operating as a safeguard—sending its silent admonitions ahead of approaching danger, or the assurance that all is well.

Looking into European railroad statistics, we find that the loss either of life or property is comparatively small, and mostly confined to individual cases, with which the companies have nothing to do. If we look for the superior safety of European roads over our own, we find that it lies in their close attention to, and excellent management of, their system of railroad telegraphs.

The want of a complete system of telegraphs in this country, to protect the lives of the traveling public, as well as the interest and property of the railroad companies, has been for years the subject of severe comment by editors, and the unfailing ground upon which to charge carelessness home upon the managers. If every railroad were furnished with its own complete telegraph, the number of accidents would be greatly diminished.

Charles Kirchhof, of No. 86 Duane street, New York, exhibits two of his newly invented telegraph instruments, and they are the only articles of the kind in the Fair. This invention is specially designed for use on railroads, fire-alarm telegraphs, police stations, etc. Its distinguishing feature is that any person, without previous experience, can operate its parts, and readily forward and receive messages. The instrument is contained within a small ornamental box having a glass dial and pointer. The dial has the letters of the alphabets marked thereon; and a series of keys are arranged in a circle around the dial. By touching a key, the pointer moves to the corresponding letter on the dial. The instrument operates beautifully, and is one of the greatest novelties in the Exhibition.

The superior qualities claimed by the patentee for his invention are as follows:—Any person who can read the alphabet and form letters into words is capable of operating, and can do so after a few minutes' familiarity with the instrument. No special operator is necessary, as any one connected with the railroad—conductor, engineer, or ticket-master—can use it with success. All mechanical force, such as clock-work, in operating the instrument, is dispensed with, electricity being the only material power depended on; hence, an uniform and certain action, not subjected to changes or disturbances, is attained. Its last, but not least, superior quality, is its portability, and reliableness under any emergency that circumstances may offer. It can be as easily operated by the road-side, upon a man's knee, as when permanently placed in an office. One or more of the instruments may be carried on the railroad train; and in case of accident, telegraphic communication may be immediately opened with any desired station along the line, by throwing a piece of wire over the main telegraph conductor. The invention is adapted to telegraphing upon a large or small scale.

MUSIC BY STEAM—THE CALLIOPE.

The horrible shriek of a steam-whistle, which is either so piercing as to make one tingle all over, or else so very hoarse that one is inclined to think the engine has got a cold in its head, and that it will shortly have to stop and blow its boiler—this ugly inharmonious sound is, at the Crystal Palace, made to fall in regular cadences, and produce tolerable music, and is what may truly be called a novelty. It is, in fact, *the* attractive feature of the Exhibition. Whenever it plays an immense crowd always gather to hear it "discourse sweet music." The method of its arrangement is very simple: a number of steam whistles, each tuned and regulated to produce a certain note, are placed in order on a long steam pipe, and the steam admitted to each by valves, which are connected by wires to a key-board at one end, and a barrel at the other, so that it can be played as a barrel organ or as a piano. This is another application of steam, for which we are scarcely prepared at present; and it may be difficult to realize the fact that the same force which we now employ for hard, unflinching work, can be made to be an object of ornament—a high grace of art. And yet, when we consider that the steam engine is the result of the singing of a tea kettle impressing the genius of James Watt, it may not be unappropriate that its highest application should be a musical instrument. It is far more suitable for sacred than secular music, from the volume and deepness of its tones; and the day may not be far distant when it will be considered a necessary adjunct of large churches.

The Calliope has, however, one great advantage, and that is, that it can be heard by multitudes at once, as it is very loud. The agent is A. S. Denny. These organs are manufactured by the American Steam Music Co., Worcester, Mass. The American and European patents were secured through the Scientific American Patent Agency.

The Best Form of Iron to Resist Internal Pressure.

Professor Fairbairn, of England, expresses it as his opinion that the cylindrical or spherical is the most eligible and the strongest form in which iron plates will resist internal pressure. The deduction for loss of strength, on account of riveted joints and the position of the plates is about 30 per cent for the double-riveted joints, and 44 per cent for the single ones, the strengths—calling the plates 100—being in the ratio of 100, 70, and 57. The Professor found that 34,000 pounds to the square inch was the ultimate strength of boilers having their joints crossed and soundly riveted. Flat surfaces, frequently essential, are not so objectionable with respect to strength as they appear to be at first sight, and when properly stayed, are the strongest part of the construction. There is found to be a strong analogy as respects the strength of the stays when screwed into the plates, whether of copper or iron; and riveting adds nearly 14 per cent to the strength which the simple screw affords.

Making Wood Fire-proof.

Professor Rochelder, of Prague, has just discovered a new anti-phlogistic material, which promises to become of importance. It is a liquid chemical composition, the secret of which is not yet divulged, which renders wood and other articles indestructible by fire. Several successful experiments have been made, and others are promised on a larger scale.

Pleasure of Reading.

Of all the amusements that can possibly be imagined for a working man, after daily toil, or in the intervals, there is nothing like reading a newspaper or a book. It calls for no bodily exertion, of which already he has had enough, perhaps too much. It relieves his home of dullness and sameness. Nay, it accompanies him to his next day's work, and gives him something to think of besides the mechanical drudgery of his every-day occupation; something he can enjoy while absent, and look forward to with pleasure. If I were to pray for a taste which would stand by me under every variety of circumstances, and be a source of happiness and cheerfulness to me through life, and a shield against all its ills, however things might go amiss, and the world frown upon me, it would be a taste for reading.—*Sir John Herschell.*

Variable Eccentric.

The variable eccentric does away with the great amount of link work usually connected with eccentrics on steam engines. This invention relates to the fitting of the eccentric to its shaft in such a manner as to be capable of adjustment transversely to the shaft to vary the length of, or reverse the direction of, the throw. This is done by giving the eccentric a permanent eccentricity in a direction at right angles to the direction of the adjustment, by which arrangement a constant lead is given to the valve in either direction of the revolution of the engine, and thus a single variable eccentric is made to constitute a complete and perfect substitute for the two eccentrics and link motion employed in the locomotive engine. It is the invention of S. L. Wiegand, of Philadelphia.

Burglar Alarm and Defense.

This little implement of war is a pistol a few inches long, so that it can be used as an ordinary pistol and carried in the pocket, or so arranged that at night it can be screwed into your bedroom door, and on any attempt to force it open, the pistol is discharged, and sends a bullet through the intruder before he is aware of it. It is a useful invention for travelers and others, and was invented by E. M. and J. E. Mix, of Ithaca, N. Y.

Setting Diamonds.

Isaac Lindsley, of Providence, R. I., has invented and patented a new method of setting diamonds, natural or artificial, in an open setting, which combines great strength with lightness. He sets them in points, which are stamped on by a die, and have a firm, flat plate of metal at the back, so that very little metal is seen, and it improves the appearance of the brilliants.

Laths and Fence Pickets.

J. H. Bachelder, of Rome, Mich., has invented a machine for sawing laths and fence pickets out of the rough log at one operation. There is no taking the log out, and cutting first one way and then the other, but the whole is done automatically by the machine, thus saving time and labor.

Self-Acting Gate.

By this gate, the invention of C. A. Howard, of Pontiac, Mich., the trouble of opening gates is done away with, as by an arrangement of springs and suitable mechanism, when a vehicle approaches it, it opens itself, and when through, closes again. This will answer well for gentlemen's grounds and other places.

Spikes.

Orrin Newton, of Pittsburg, Pa., has invented a new form of spike, which consists in giving the four faces a concave form, thus economizing the metal by giving greater strength with the amount of material than any other form, and renders it easier to drive, and has a firmer hold when in.

Pressure Gage.

Henry Bates, of New London, Conn., has invented a new pressure gage, which is considered a very great improvement. The claim in our List of Patent Claims explains the nature of it.

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Correspondents

THE following English patents have recently arrived, and we would thank the owners to call or send to our office and receive them : W. Mt. Storm, J. R. Pratt.

J. H. G. & Co., of Ohio.—We are glad to hear of your prosperity in selling the husking thimble, and also to know that we have helped your sales so materially.

E. B., of N. H.—We have seen a light colored India rubber cloth frequently, and have no doubt you could get it by applying to some large manufacturer of India rubber goods.

O. F. L., of Mass.—You cannot obtain a patent on your discovery, as there are already six methods of effecting your object, known to the simplest analytical chemist. A solution of good common salt is equivalent to hydrochloric acid and soda.

J. S. P., of Ohio.—The principles which flax extracts from the soil are organic matter to furnish the oil and silica to strengthen the stem. The latter may be remedied by ploughing the stems in again, and the former by a good supply of animal manure; but it is usual to leave the ground idle for four or five years—in Belgium seven.

H. M. S., of N. Y.—You are undoubtedly right in supposing that you have increased the draft by the addition made to the chimney. The draft of a chimney increases with its hight as long as the air continues to escape from the chimney at a higher temperature than the atmosphere. We cannot give you any rule to determine the proper hight of your chimney, as much depends on the form of the furnace and the throat. We have from time to time published articles on chimneys. Your plaster of Paris must be impure, and it would depend on the nature of the impurity as to what would be necessary to improve it. At any rate we do not suppose it would pay you to do anything with it.

C. S. L., of Va., wishes to know the best method of gilding on glass. He says that the process he has adopted is the following, but it does not answer very well:—"I just make a letter of oil pasteboard, and use it as a pattern to cut out a tinfoil one, then I paste this on the glass with a solution of gum arabic; when dry, I give the whole a coat of paint, and when this is dry, I pick off the tinfoil letter, wash away the gum, and coat the space with diluted white of an egg, on which I place the gold leaf, and when dry I burnish with chamois skin." This method does not seem to suit; perhaps some of our readers could suggest something better.

T. McN., of Ill.—It is not with all cargos that ballast is required, but in many instances the cargo is loaded in from the floor or bottom of the vessel to as high a point as any cargo is carried. Very great judgment is required in stowing a miscellaneous cargo, in order that the ship may ride easily and not roll. The greater portion of the weight should not be too high or too low, and when any such space as you speak of is left, it is when, from the nature of the cargo, it is desirable not to fill the hold. We suppose the portion you refer to, as where they usually stow freight, to be what is called "between decks."

W. W. D., of Cal.—We are in receipt of your English patent; and on receipt of the French we will send both by express.

J. W. H., of Mass., T. W. B., of Ohio, A. C. C., of Me., J. A., of Mass.—We have examined with interest your views in regard to the gyroscope paradox, but do not feel justified in devoting more space to its consideration, to the exclusion of other matter of more general interest. We thank you for your communications.

C. A., of Pa.—Hooks and eyes are made by machinery. By going to Waterbury, Conn., we presume you could see the whole operation. Do not know the probable cost of such machinery.

Swift & Estes, of St. Peters, M. T., wish to open correspondence with manufacturers of boring and rifling machinery used in making fire-arms.

W. D. P., of C. W.—In answer to your query as to "Whether electricity is subject to the same laws as magnetism as regards the attractive power of iron," we may briefly say it is. They are both attracted by all metallic substances in a greater or less degree. The radius within which conductors act is not precisely known. The exact distance which a rod will attract these forces depends on the conditions of the atmosphere and other irregularities.

C. C., of Pa.—Send on the model of your improvement without delay, and we will prepare the case at once. Some of the departments of the Patent Office are nearly "squared up," and you will not need to wait long to get a final decision. It is a good time to present applications.

O. F. S., of Mass.—We do not think that the presence or absence of a beard much affects the brain, or that its weight has much influence on the position of the head.

C. J. H., of N. Y.—We have heard of imitation ivory, in fact, it is very old. An imitation of mother-of-pearl is made from rice.

Money received at the Scientific American Office on account of Patent Office business, for the week ending Saturday, October 3, 1857 :—

C. & M., of Vt., $30; S. P. C., of Ohio, $30; J. P., of L. I., $35; H. O. E., of N. Y., $25; J. D. S., of ——, $35; E. L. G., of Conn., $25; J. L. A., of N. J., $20; G. S., of Pa., $25; J. W. R., of N. J., $25; J. M., of ——, $20; J. G., of Ga., $26; G. S., of Pa., $25; S. B. D., of Ohio, $30; S. & B., of Me., $250; E. W. S., of Ky., $100; S. S., of Ky., $20; D. E. H., of Ill., $30; T. K., of N. Y., $10; F. A., of Conn., $50; W. S. W., of L. I., $20; W. & R., of Vt., $25.

Specifications and drawings belonging to parties with the following initials have been forwarded to the Patent Office during the week ending Saturday, Oct. 3, 1857 :

W. S. W., of L. I ; J. P., of L. I.; H. O. E., of N. Y.; W. & R., of Vt.; J. W. R., of N. J. ; J. G., of Ga. ; E. L. G. of Conn. ; L. A. B., of N. Y. ; G. S., of Pa.

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Science and Art.

Sorgho Sucre Experiments.

The Charleston *Courier* of the 12th instant, contains the following: "We are indebted to the politeness of Capt. A. Roumillat, proprietor of the well known manufactory in King street, in this city, for the results of a trial which he has given to the Sorgho cane, for the purpose of testing its possibility of crystallization. Capt. R. procured 300 canes from the farm of Thos. H. Deas, which, after being properly crushed, produced 21 gallons of juice. This juice, after boiling and evaporation, yielded three gallons and three quarts of syrup. He then boiled it to the granulating point, but the syrup refused to granulate; it was rather inclined to burn. The experiment was made under Captain Roumillat's own eye, and every care was taken that it might be successful." We are happy to state that from other sources we have every reason to believe that the Sorghum contains a crystallizable sugar and if we cannot get it out by the ordinary methods of boiling, we must invent some other process; that's all. It must be done, and we have no doubt that some chemist will be found to do it.

Fire-Brick.

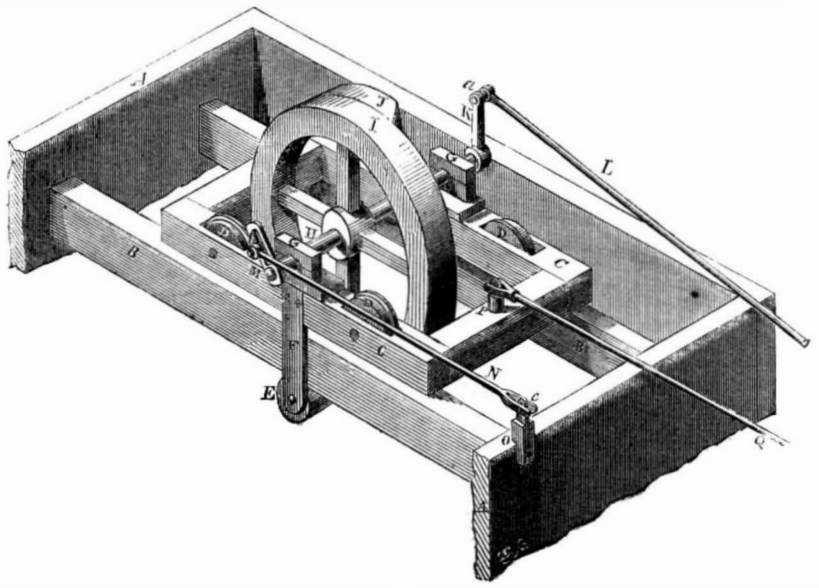
The materials requisite for the manufacture of good fire-brick are very plentiful in the United States. There is an abundance of fire clay, also kaolin, the result of the decomposition of feldspathic rock, which is very common between the Allegheny mountains and the shores of the Atlantic; and it is more abundant in the Southern than in the Eastern and Northern States. In the region of the Western coal deposits, an abundance of slaty clay of good quality is found; and fire-clay, in one or other form, abounds also in the Western States. In this connection it may be remarked, that when fire-brick of a finer composition are required, it is necessary that the materials should be ground fine. The quartz sand used to increase the refractory nature of the brick should be pure. The clay thus mixed with quartz, or pure, is subjected to grinding, which should be done carefully and thoroughly, that the brick may be compact. Carbon, in the form of graphite or anthracite dust, or coke dust, is often mixed with the clay from which crucibles are made. M. Overman states, in his work on Metallurgy, that fire-bricks which are manufactured and used on the spot do not require baking, but only those which are to be transported.

Kaefer's Method of Transmitting Motion.

The machine we are about to describe is for the purpose of equalizing the force and neutralizing the effect of the dead points in the conversion of reciprocating into rotary motion, by means of a crank, and from what little we have seen of the model it certainly does; and it does this on philosophical principles and not as some inventors attempt, viz: to do impossibilities in defiance of the laws of motion, which are rigid and must be obeyed. These laws of motion are supreme from the fact that they do not depend on the nature of the substance moving, although that may in some degree modify the effects; but they are properties of matter and as much a quality of all material substance, as color, weight, impenetrability or shape.

The engraving is a perspective view of the whole machine, which shows all the parts of which it is composed. A is the frame and B B two ways running from end to end of the frame—these support a carriage C, provided with flanged wheels D, upon which the carriage can traverse the ways B, and in order to keep it firmly on the ways to hinder it from jumping, it is further provided with two rollers E, (one of which is only seen) connected by the arms F. In suitable boxes on the carriage are supported the journals of a shaft H, which carries a fly or balance wheel I, loaded with a weight J. On one end of H is the crank K, and to a wrist pin, *a*, is connected the end of a rod, L, which communicates with the piston, or any prime mover, from which power is obtained to drive the machinery. And to the opposite end of the shaft is affixed another shank, M, standing at a quarter of a circle or 90° from the crank, K. This crank, M, is slotted so as to receive a wrist pin, *b*, that can be adjusted in said slot at pleasure, to this is attached the rod, N, whose other end is pivoted to an arm made fast to the frame as seen at O. The adjustment of the wrist pin, *b*, in the crank, M, regulates the amount of traverse of the carriage on its ways. A standard

IMPROVEMENT IN TRANSMITTING MOTION.



or arm, P, is firmly set in the carriage, C, to which one end of a rod is attached, this is the rod that drives the machinery and its action is as follows: Suppose the weight, J, in the position shown, and a forward motion given to the rod, L, the weight will add the descent and carry (by the force it has acquired) the whole over the dead points, and this will have been rendered easy and smooth by the motion of the carriage, which, when the weight, J, is again brought up to its original position, will have traversed the ways backward and forward once, thus giving an increased, easy and reciprocating motion to the bar, Q, which drives the machinery. This is the whole arrangement, and was patented the 5th May, 1857. It is now on exhibition at the Crystal Palace.

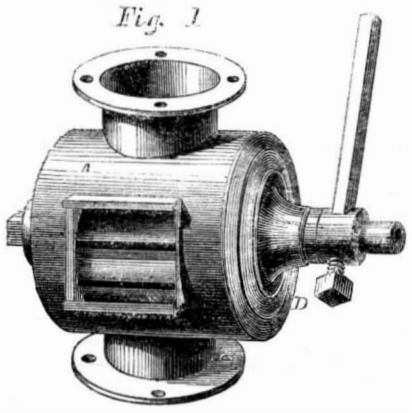
For further information and particulars apply to the inventor and patentee, Mathaus Kaefer, Alexandria, Pa., or at the Palace during the Fair of the American Institute.

Simmons' Improved Throttle Valve.

The improvement which characterizes this valve consists in the arrangement of the several openings in the cylinders forming the valve, which openings are so constructed that the steam-ways, ports, may be perfectly controlled with a very slight rolling motion of the spindle of the valve, and an equal bearing of steam from the boiler on the valve will be more perfectly attained than by those valves now in common use; therefore the improvement is a balanced valve, in the strict sense of the term.

By the employment of a latch and lever, the valve can be set so that any desired quantity of steam may be obtained, and at the same time it controls and entirely shuts the

Fig. 1



throttle, in the event of the strap of the governor breaking, thus preventing the damage which usually follows such an accident.

Fig. 1 is a perspective view of the whole, with a piece of glass inserted on the side, so that the valve may be seen; Fig. 2 is a vertical section parallel with the axis; and Fig. 3 is a vertical section at right angles with the axis of the valve. The same letters refer to similar parts in each figure.

A is the outer case of the valve, and *a* is an inner case or valve seat, of a diameter somewhat less than the case, A. On the ends of *a* are raised flanges, *d d*, extending partially around it, so as to form a steam passage, dividing it from the exhaust chamber, *f*. *g g* is the cylindrical valve, fitting accurately within the shell, *a*. It is provided with parts or openings, *b b b b b b*, for the entrance of steam from opposite sides of the valve. B is the valve stem passing through the center of the valve, and supporting it by means of a flat disk, *c c*, which connect the stem and valve. The spindle is packed in the usual way, and supported by a screw or bearing.

The latch, *h*, (shown in Fig. 2,) is secured on the stem, B, by screw or clamp nuts; the

Fig. 2

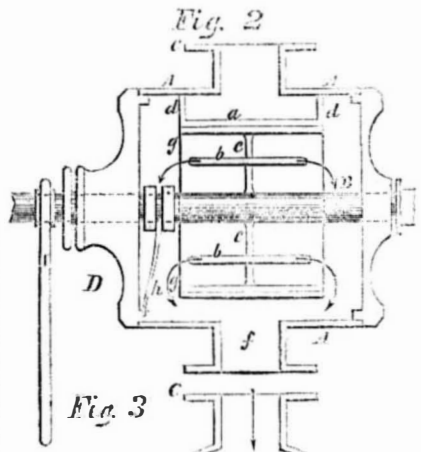
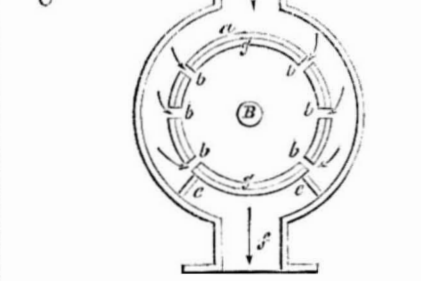


Fig. 3



outer end falling freely between the shoulders of a recess cut in the flange of the head, D.

The operation of the valve may be thus described:—The stem being placed horizontally (although it may be placed in any position,) the steam pipe from the boiler is connected with the flange, C, and the steam passes between the case, A, and inner case, *a*; then on the rotation of the stem, B, and valve, *g*, the ports or openings, *b b*, are opened, and the steam passes through them, is discharged over the ends of the valve *g*, and seat *a*, and enters the exhaust chamber *f*, from whence it passes into the cylinder. The course of the steam in its discharge is indicated by the arrows in the drawing. It will be seen that the steam bears equally on all sides of the valve, and therefore gives a degree of sensibility to the governor.

The peculiar action of the latch may be thus stated:—On starting the engine, the latch is set by raising the lever, I, and with it the latch, *h*, as both are secured to the stem, B, so that the ports shall be fully open when the engine is started. They are then left in that position, and in the event of the strap of the governor breaking, flying off, or any sudden stoppage of the crank shaft, the weight of the lever will cause a change of position of the latch, and in its turning the ports are closed, the ingress of steam prevented, and the engine stopped. This invention was patented June 23, 1857.

Any further information and particulars may be obtained from the inventor and patentee, James H. Simmons, Erwin, N. Y., or Curtis, Erwin, Brooks & Co., Painted Post, N. Y.

NEW Prospectus

OF THE

SCIENTIFIC AMERICAN.

VOLUME THIRTEEN.

TO MECHANICS, MANUFACTURERS, INVENTORS AND FARMERS.

In announcing the THIRTEENTH Annual Volume of the SCIENTIFIC AMERICAN, which commenced on the 12th of September, the Editors and Publishers embrace this opportunity to thank their numerous friends and subscribers for the encouraging and very liberal support heretofore extended to their journal, and they would again re-assure its patrons of their determination to render the SCIENTIFIC AMERICAN more and more useful, and more and more worthy of their continued confidence and good will. The undersigned point to the past as a guarantee of their disposition to always deal justly and discriminatingly with all subjects of a Scientific and Mechanical character which come within their purview.

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Names of subscribers can be sent in at different times and from different Post Offices. The cash will be paid to the orders of the successful competitors immediately after the 1st of January, 1858.

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